

Population status of Jackson's Widowbird *Euplectes jacksoni* in Mau Narok-Molo grasslands Important Bird Area, Kenya

Geoffrey Mwangi Wambugu and Josephine Nzilani

Tropical grasslands occur both at lowlands and highlands. Highland grasslands in Kenya are known to occur between 2200 m and 3000 m altitude with a minimum of 1000 mm rainfall, and with frequent mists (Pratt & Gwynne 1977). In Kenya, most highland grasslands are privately owned, and none of them is under legal protection under the current protected area system. The Mau Narok-Molo Grasslands and the Kinangop Grasslands Important Bird Areas (IBAs), on either side of the central Rift Valley in Kenya, are the only sites that hold significant areas of Kenya's unique highland grasslands. These grasslands are important for a number of migratory bird species and various specialized grassland birds of which the key species are two threatened Kenyan endemics—Sharpe's Longclaw *Macronyx sharpei* and Aberdare Cisticola *Cisticola Aberdare*, in addition to one restricted range and globally Near Threatened species, Jackson's Widowbird *Euplectes jacksoni* (BirdLife International 2007). Additionally, the Mau Narok-Molo IBA holds distinctive avifauna and other little-studied and unique biodiversity. Other bird species of conservation concern that occur here include Lesser Kestrel *Falco naumanni* (Vulnerable), Great Snipe *Gallinago media* (Near Threatened), Great Crested Grebe *Podiceps cristatus* (Regionally Critical) and Denham's Bustard *Neotis denhami* (Regionally Endangered).

Historically, the habitat in Mau Narok and Molo was mainly tussock grasslands, which favoured the survival of grassland-specialist bird species. However, increasing human settlements into the area by both the large-scale and small-scale agriculturally based communities since the 1960s left the birds almost exclusively on privately owned land. As the human population in these areas continues to grow, increasingly more grasslands are converted to other uses (Ndang'ang'a & Mulwa 2002). Grasslands are now found within privately owned land holdings, which are gradually decreasing in size due to land subdivision and intensive use of the resultant land parcels. Consequently, native tussock grasslands are rapidly being fragmented and converted into pasture, arable land, woodlots or residential plots. This has serious implications for the conservation of grassland biodiversity.

The Mau Narok-Molo area is home to thousands of Kenyans, mainly comprising of two small-scale farming communities and a pastoralist community (Ndang'ang'a & Mulwa 2002). Farming, both commercial and subsistence, is the main economic activity. As a result, the grasslands are being

cleared and converted into cultivation, precipitating a steep decline in their extent and quality. Because of its biological importance and the severe threats that it faces, the Mau Narok-Molo Grasslands IBA is classified as Critical in priority for conservation action (Bennun & Njoroge 1999).

Prior to this study, Jackson's Widowbird status in the Mau Narok-Molo Grasslands IBA was unknown (Bennun & Njoroge 1999). It is believed to be a seasonal visitor in Kinangop Grasslands IBA where it nests in tussock grasslands, and occasionally in wheat fields. It appears that these two IBAs hold significant numbers of this species and are believed to be the world's stronghold for the species. As indicated, both Kinangop and Mau Narok-Molo grasslands are under enormous pressure for conversion, especially through the removal of tussocks that are believed to be unpalatable for livestock (Ndang'ang'a & Mulwa 2002).

Because an effective conservation programme for any vertebrate species can only be administered when its ecology is adequately known (Soule & Kohm 1989), this study aimed at gathering the basic ecological information as baseline data upon which conservation programmes for Jackson's Widowbird could be developed. This was achieved by determining the population size and density of the species, as well as assessing the threats facing it.

Study area

The Mau Narok-Molo Grasslands IBA is an extensive stretch of montane grassland along the crest of the Mau escarpment, which forms the western wall of the central Rift Valley in Kenya (Bennun & Njoroge 1999, Ndang'ang'a *et al* 2003). This high open plateau runs approximately 80 km southeast to northwest, and is bound on each side (and partially interrupted) by the forests of the Mau Forest Complex (Figure 1). Rainfall is around 1000 mm per year, and the typical vegetation is short grassland with some heather and scrub on the ridges where soil is deeper. The area has high potential for agriculture, and has been progressively settled on by humans since the 1950s; it is now heavily populated, with a landscape enormously modified by cultivation. Cereals are the major crops.

This IBA largely falls within Nakuru district, with a small portion in Narok district, both within the Rift Valley province, Kenya. Human population density in Nakuru district is high, with about 164 people km² in 1999 (Republic of Kenya 2001). Grasslands in the IBA occur in two major blocks: the Molo block falls entirely within Nakuru district, whereas Mau Narok block falls within both districts.

Field methods

The survey was carried out between October 2006 and March 2007. Study plots were chosen based on their representativeness of grasslands in the site. A total of 28 study plots were surveyed, each approximately 4.5 ha: 15 plots at Mau Narok and 13 at Molo. Data were collected over four sessions (16th to

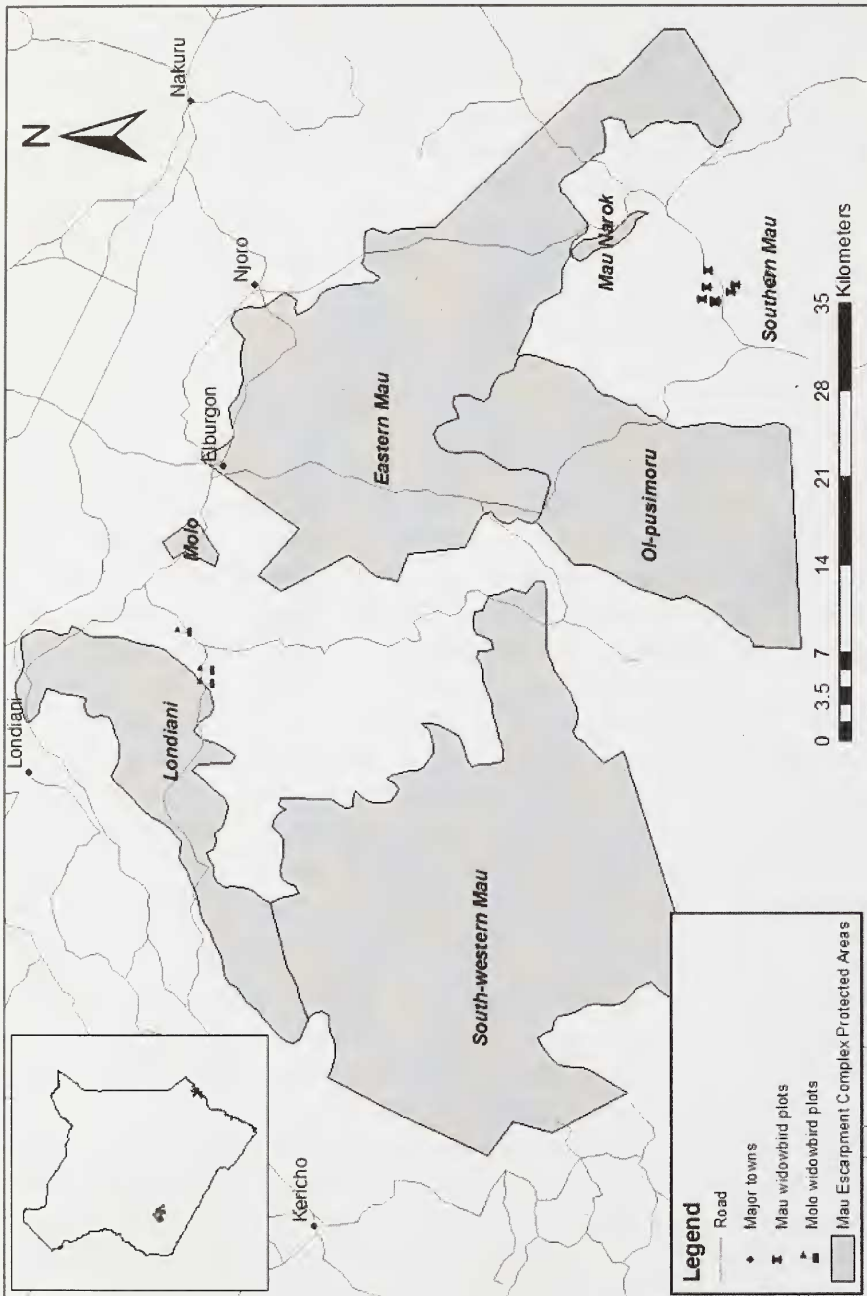


Figure 1: Map of the Mau escarpment forest complex with the 10 plots where the Jackson's Widowbird was recorded during this study; inset is a map of Kenya showing the location of the Mau complex

27th October 2006, 15th to 26th December 2006, 19th to 30th February 2007 and 21st March to 31st March 2007). Following a randomly determined sequence, every plot was counted once during each session. Fieldwork was carried out two times a day (06:30-10:00 and 15:00-18:30).

Bird Census

In each study plot, a total count of birds was done. Because the remnant grassland patches are usually long and thin, 2-5 observers walked along a line transect running along the length of the plot counting all birds seen or heard within the grassland patch.

Vegetation Survey

Vegetation was sampled within a 50-m radius sub-plot located every 150 m along the line transect traversing each plot. Grassland characteristics including grass height, percentage cover of tussock species, tree cover, shrub and wetland cover were recorded within this sub-plot. Tussock height was recorded in classes of 5-15 cm (G1), 15-30 cm (G2) and >30 cm (G3). Tussock cover was classified as: 0-10 % (T1), 10-40 % (T2), 40-70 % (T3) and 70-100 % (T4) (see also Ndag'ang'a *et al.* 2003). Burning was recorded as vegetation burnt (grass, tree, and shrub) and fire severity, while agricultural pattern (contiguous fields, scattered field and sparse field) and intensity were also noted.

Results and Discussion

Survey overview

We recorded a total of 108 bird species during the study, 85 at Mau Narok and 76 at Molo. Fifty-seven species occurred in both sites. A total of 3695 individual birds were counted, 2439 in Mau Narok and 1256 in Molo. In addition, we recorded 13 Palaearctic migrants and seven afro-tropical migrants (Wambugu & Nzilani 2007). The five most widespread species over the entire area were the Common Fiscal (encountered in 27 out of 28 plots), Baglaffeht Weaver (21), Common Stonechat (20), Grassland Pipit (19), Streaky Seedeater (19) (Wambugu & Nzilani 2007). The two endemic and endangered species—Aberdare Cisticola and Sharpe's Longclaw—were encountered in 15 and 4 out of the 28 plots, respectively. Jackson's Widowbird was encountered in 10 of our 28 study plots and was the 13th most encountered species (Appendix).

Population size and density of Jackson's Widowbird

We recorded 27 flocks of Jackson's Widowbirds with a total of 1053 individuals in 10 study plots (Figure 2). Seven plots were in Mau and three in Molo. Overall, Mau Narok had 20 flocks with a total of 601 individuals, whilst Molo had seven flocks with 452 individuals. Jackson's Widowbird occurred at a mean density (\pm SE) of 2.1 ± 0.95 birds ha^{-1} ($n = 112$) across the entire study area. The difference in the Jackson's Widowbird mean density at Mau Narok (2.2 ± 1.33 , $n = 72$) and Molo (1.9 ± 1.35 , $n = 56$) was not significant (T-test: $t = 0.05$, $df = 126$, $p = 0.48$). Variation in the mean widowbird densities across all the 10 plots and the four sessions was also not significant (Kruskal Wallis: Plot: $H [9, N = 40] = 2.1$, $p = 0.99$; and Sessions: $H [3, N = 40] = 2.5$, $p = 0.48$).

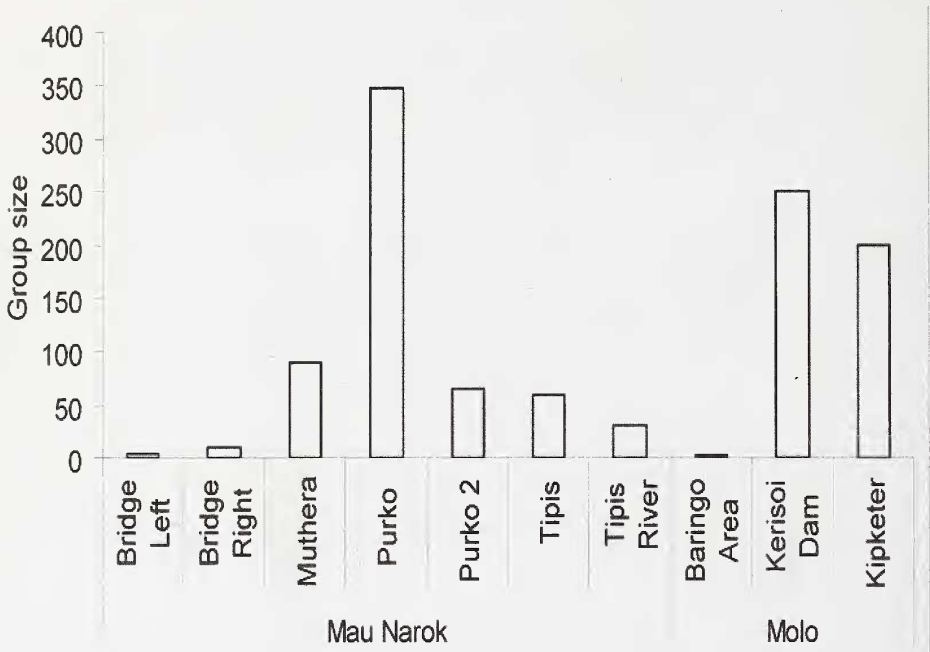


Figure 2: Numbers of Jackson's Widowbird recorded in the 10 plots in the Mau Narok-Molo Grasslands IBA

Grassland quality

Generally, there was a higher occurrence of short (G1) tussocks in Mau Narok than in Molo although the difference was not significant (T-test: $t = 0.8$, $df = 13$, $p = 0.22$). Mau Narok had significantly higher occurrence of tall (G3) tussocks than Molo (T-test: $t = 3.2$, $df = 19$, $p = 0.003$) where medium (G2) tussocks mostly featured (Figure 3). Tussock cover was generally similar in both areas, with both sites recording higher frequencies of medium (T2 and T3) than either high (T4) or low (T1) (Figure 4).

Neither tussock height nor tussock cover appeared to influence the occurrence of Jackson's Widowbird, because this species was highly mobile and hence difficult to determine microhabitat preference precisely in the duration of this study. However, this might not be the case during the breeding season when the species is known to prefer tussock grasslands for nesting (Bennun & Njoroge 1999).

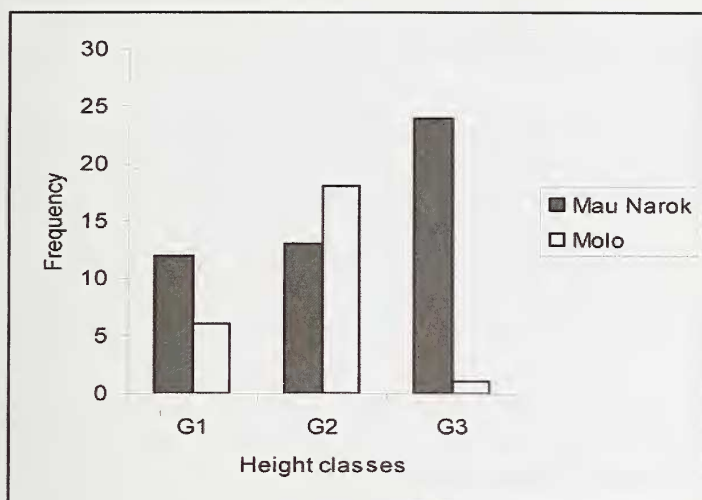


Figure 3: Tussock height variation in the Mau Narok-Molo Grasslands study sites

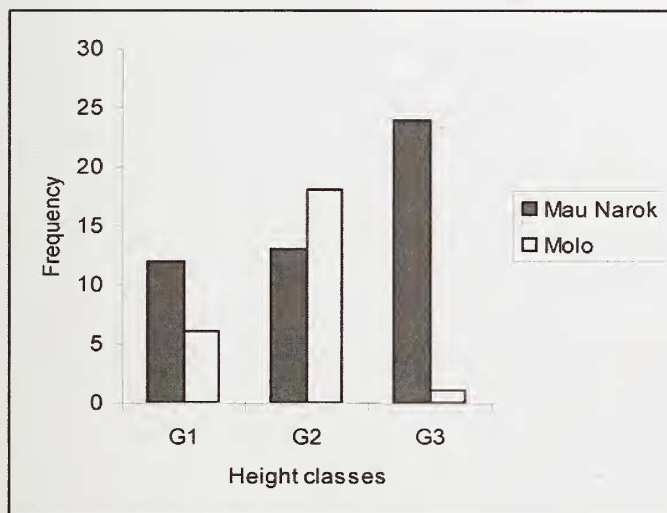


Figure 4: Distribution of tussocks in the Mau Narok-Molo Grasslands study sites

In the Mau Narok block, high quality (dense and relatively undisturbed) tussock grasslands now chiefly occur along river valleys. This is partly because large scale commercial wheat and barley cultivation is more common here, and heavy agricultural machinery cannot access these valleys. Additionally, the Maasai community is the dominant community and they traditionally value livestock rearing. As a result, they leave large, relatively intact patches of grassland for pasture. On several occasions, Jackson's Widowbirds were found performing courtship displays in these river valleys. Because wheat and barley cultivation is sometimes financially unpredictable, farmers may

make losses in some years after which some opt to leave their farms fallow for a while. It appears that tussock grasslands regenerate relatively fast in abandoned wheat fields.

In Molo, however, far fewer tussock grasslands occur compared to Mau Narok. The area is more densely settled by the small-scale agricultural-based communities. Because of the higher human population density, land parcels are ultimately smaller due to subdivision. Progressively smaller areas are therefore reserved for pasture (also mainly along river valleys), and more often than not, they are heavily grazed. Furthermore, fewer tussocks occur on these grasslands because they are considered unpalatable for livestock and hence selectively removed.

In summary, grasslands are disappearing at a fast rate and are being replaced by cultivation of mainly wheat, barley, and maize among other crops. Even though the Jackson's Widowbird exploits these crops for food, the loss of grassland habitat may have serious effects on the breeding success of the species, because it seems to require high quality grasslands for both courtship and nesting.

Acknowledgements

We are grateful to the farmers of Mau Narok and Molo who allowed us to access their farms. Staff and interns of Ornithology Department of NMK assisted in data collection, particularly Phillista Malaki and Berry Ochieng. We also thank the sub-chief of Olokurto division who was very instrumental and supportive during the survey. Prof. Ara Monadjem provided useful comments on an earlier version of the manuscript. Financial support for this study was provided by the African Bird Club (ABC). The Ornithology Department (NMK) provided equipment and logistical support.

References

- Bennun, L.A. & Njoroge, P. 1999. *Important bird areas in Kenya*. Nairobi: Nature Kenya
- Bibby, C., Jones, M., & Marden, S. 1998. *Expedition Field Techniques*. London: Expedition Advisory Centre
- BirdLife International 2000. *Threatened birds of the world*. Cambridge U.K.: BirdLife International and Barcelona: Lynx Edicions
- BirdLife International 2007. *Species factsheet: Euplectes jacksoni*. Downloaded from <http://birdlife.org> on 14/6/2007
- Buckland, S.T., Anderson, D.R., Burnham, K.P. & Laake, J.L 1993. *Distance Sampling: Estimating Abundance of Biological Populations*, 1st Ed. London: Chapman and Hall
- Fishpool, L.D.C. & Evans, M.I. 2001. *Important Bird Areas in Africa and Associated Islands: Priority Sites for Biodiversity Conservation*. Newbury: Pisces Publications.
- Ndang'ang'a, K. & Mulwa, R. 2002. *A preliminary survey of the Mau Narok/Molo grasslands, Kenya*. Research Reports of the Centre for Biodiversity, National Museums of Kenya: Ornithology 44
- Ndang'ang'a, K., Mulwa, R. & Gichuki, P. 2003. A survey of highland grassland endemics of Mau Narok/Molo Important Bird Area, Kenya. *Bulletin ABC*

10: 64- 67

- Pratt, D.J. & Gwynne, M.D. 1977. *Rangeland Management and Ecology in East Africa*. London: Hodder and Stoughton
- Republic of Kenya 2001. *The 1999 Population and Housing Census 1999, Volume 1*. Nairobi: Central Bureau of Statistics, Ministry of Finance and Planning
- Soule, M.E & Kohm, K.A. 1989. *Research priorities for conservation biology*. Washington D.C.: Island Press
- Wambugu, G.M. & Nzilani, J. 2007. *Conservation status of Jackson's Widowbird Euplectes jacksoni in Mau Narok-Molo Grasslands Important Bird Area, Kenya*. Research Reports of the Centre for Biodiversity, National Museums of Kenya: Ornithology 73.

Geoffrey Mwangi Wambugu

Ornithology Section, Department of Zoology, National Museums of Kenya, P.O. Box 40658 00100, Nairobi, Kenya. Email: mwajeffa@yahoo.com

Josephine Nzilani

Tropical Biology Association, c/o Nature Kenya, P.O. Box 44486 00100, Nairobi, Kenya

Scopus 27: 10-18, January 2008

Received August 2007

Appendix: The 30 commonest bird species based on the encounter rate across the 28 plots within the Mau Narok-Molo Grassland IBA during the study period

Common name	Scientific name	No of plots encountered	Number of encounters	Total No of individuals
Common Fiscal	<i>Lanius collaris</i>	27	51	141
Baglafetch Weaver	<i>Ploceus baglafecht</i>	21	65	111
Common Stonechat	<i>Saxicola torquata</i>	20	60	105
Grassland Pipit	<i>Anthus cinnamomeus</i>	19	73	186
Streaky Seedeater	<i>Serinus striolatus</i>	19	54	149
Hunter's Cisticola	<i>Cisticola hunteri</i>	16	44	112
Dusky Turtle Dove	<i>Streptopelia lugens</i>	16	43	87
Aberdare Cisticola	<i>Cisticola aberdare</i>	15	95	178
Ring-necked Dove	<i>Streptopelia capicola</i>	15	54	93
Rufous Sparrow	<i>Passer rufocinctus</i>	13	35	68
Red-capped Lark	<i>Calandrella cinerea</i>	11	63	99
Yellow Wagtail	<i>Motacilla flava</i>	11	20	28
Jackson's Widowbird	<i>Euplectes jacksoni</i>	10	28	1053
Capped Wheatear	<i>Oenanthe pileata</i>	9	24	44
Crowned Plover	<i>Vallenus coronatus</i>	8	14	46
Greater Blue-eared Starling	<i>Lamprotornis chalybaeus</i>	7	9	67
Speckled Mousebird	<i>Colius striatus</i>	7	10	27
Olive Thrush	<i>Turdus olivaceus</i>	7	14	25
Bronze Sunbird	<i>Nectarinia kilimensis</i>	7	11	11
Common Bulbul	<i>Pycnonotus barbatus</i>	6	9	47
African Citril	<i>Serinus citrinelloides</i>	6	10	20
Golden-winged Sunbird	<i>Nectarinia reichenowi</i>	5	8	22
Malachite Sunbird	<i>Nectarinia famosa</i>	5	5	10
Northern Anteater Chat	<i>Myrmecocichla aethiops</i>	4	16	41
Sharpe's Longclaw	<i>Macronyx sharpei</i>	4	6	12
Speke's Weaver	<i>Ploceus spekei</i>	3	6	27
Lesser Masked Weaver	<i>Ploceus intermedius</i>	3	4	22
African Mourning Dove	<i>Streptopelia decipiens</i>	3	6	11
Harlequin Quail	<i>Cortunix delegorguei</i>	3	3	3
Pin-tailed Whydah	<i>Vidua macroura</i>	3	3	3